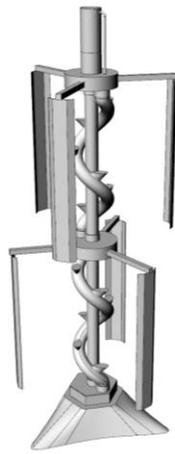


# Hydroponic Tower

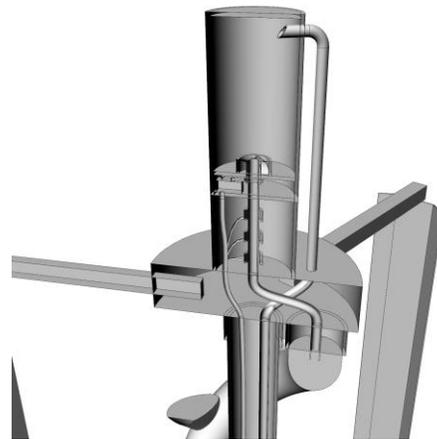
Optimizing Indoor Home Growing and Supporting Small Business

## Description

The Hydroponic Tower is a vertical hydroponic growing system with unique advantages over other tower designs. The towers will have a built-in water vitalizer (see "Vitalizer" document). Testing done with water vitalization has produced higher biomass and nutrient density in plants grown geoponically. Early tests indicate even greater benefits with vitalization applied to hydroponics. Another advantage is the towers will be solar powered. Designed as an indoor system, the solar panels will be powered by natural sunlight as well as the tower grow lights and any ambient indoor lighting.



*Hydroponic Tower*



*Vitalizer - top of tower*



*Solar powered - natural and artificial lighting*



*Automatically adjustable grow light*

A final advantage of the Hydroponic Tower is the incorporation of Dunedain's Calibration System (see the "Calibration System"). While the grow tower can support a variety of mixed vegetables, the most efficient use would be one tower for one crop species per harvest. The optimum water vitalization strength (voltage) varies for each species; it also varies throughout the crop's growth cycle. Lighting color and intensity is also unique per species. The calibration system is an added feature of the hydroponic tower.

## Intended Use & Purpose

The intended use of the hydroponic tower is two fold: one - to provide healthy food locally. Two - to encourage and support small business. A surplus of produce can be sold locally. The "Marketplace App" (see "Marketplace" document) can assist, allowing users to sell vegetables online.

Listed below are some of the benefits of the hydroponic tower:

- Cost - return on investment should be seen after one year of use
- Water vitalization increases yields substantially - greater biomass and nutrient density produce for the same amount of resources
- Electricity cost offset by utilizing solar panels
- Calibration System - allows crop optimization via specific water voltage and lighting
- Marketplace app - allows users to sell surplus produce, promoting small business
- Space - the tower has a footprint of approximately a 2' diameter, and about 6' tall. Over 100 heads of lettuce can be grown in a small closet sized area

## Status

Hydroponic tower design renderings complete. Schematic details awaiting funding. The tower has dependencies on the vitalizer, calibration system, and solar/lighting options. It is feasible to construct the tower with these options added separately.

## Budget, Resources, Timeline

The overall design will involve an integration of components: vitalizer, solar panels and battery, tower structure, grow lights, and seed pods. The current project includes incorporating all features.

Project	Scope	Resources	Estimate	Duration
Hydroponic Tower	Use existing solar panel and battery technology, integrate into tower. Panel LED grow lights using existing tech until calibration effort is funded. Project includes tower construction, vitalizer, solar panels, battery, pump, lights, seed pods.	Dunedain Engineers Horticulturist	\$750,000	12 months